

Disappearance of Saturn's Ring System, 1907 October.

By R. T. A. Innes.

Thanks to the assistance of Sir David Gill and the Witwatersrand Council of Education (Mr. Th. Reunert, chairman), I have within the last few days erected a 9-in. refractor by Grubb.

The disappearance of Saturn's rings was watched with this instrument on the 3rd October 1907. An exact copy of the notes made reads as follows:

1907 Oct. 3, 6.45 p.m. twilight (4.45 p.m. G.M.T.). Saturn's ring distinctly seen by myself and several visitors. It was very faint and only seemed to be about half of its usual length. Definition medium, planet low.

8.45 p.m. (6.45 p.m. G.M.T.). The ring is invisible. The bright equatorial band was crossed by a sharp dark line which just lay to the N. of Saturn's equator. This dark line had been seen on preceding nights, but on this occasion it seemed to be sharper and darker. Two satellites, about 2" or 3" apart, followed Saturn.

9.30 p.m. (G.M.T. 7.30 p.m.). Ring distinctly seen, but like a ghost. Care taken to eliminate subjective effects. Definition very good.

10 p.m. (8.0 G.M.T.). Ring still glimpsed. Preceding part of ring modified by two beads, one twice as large as the other (Enceladus and Mimas). My son's description is "Ring visible on both sides, extending about three-quarters diameter of planet. Nearer and brighter satellite is half way along ring and touches the northern side. Fainter satellite precedes end of ring."—(E. A. I.)

11.45 p.m. (9.45 G.M.T.). Quite doubtful if ring really seen. Mimas and Enceladus very close together. My son, however, was quite certain that he held the ring steadily. His words are "Ring very faint, but ended off sharply. Fainter satellite is preceding."—(E. A. I.) Definition perfect.

12.30 p.m. (10.30 G.M.T.). No suspicion of ring; only one satellite seen prec. "Ring not seen with any certainty. The first of the satellites following Saturn getting too close."—(E. A. I.) Definition very good.

Thus at	3 Oct. 1907	4.45 G.M.T.	Ring quite easy.
		7.30 "	Ring difficult but distinct.
		8.0 "	Ring still seen.
		9.45 "	Ring still glimpsed.
		10.30 "	Ring invisible.

So that, as seen in a 9-in. refractor under circumstances of good definition, the ring system became invisible soon after 9.45 and before 10.30 G.M.T. As the ring was easy to see at 4.45, and got difficult as quickly, the Earth must have passed through its plane soon after invisibility.

Observations during the period that the dark sides of the rings are exposed to the Earth answer the question as to whether the rings are composed of solid particles or of vaporous matter. If the latter, the edges at least of the rings would be seen.

Johannesburg:
1907 October 5.

Observations of the Satellite of Neptune, from photographs taken at the Royal Observatory, Greenwich, between 1906 December 27 and 1907 April 24.

(Communicated by the Astronomer Royal.)

The following measures of position-angle and distance of Neptune's satellite were made from photographs taken with the 26-in. refractor of the Thompson equatorial. The occulting shutter was used as in previous years. The photographs were taken by Messrs. Davidson, Edney, or Melotte, and were measured in a position micrometer in direct and reversed position by Messrs. Davidson and Melotte. The tabular positions with which comparison is made were computed from the data given in the *Connaissance des Temps*, based on Dr. Hermann Struve's elements, the eccentricity of the orbit being neglected.

A discussion of these residuals gives the following differences from Dr. Hermann Struve's elements in the sense Tabular - Observed :

$$du = -1^{\circ}03 \quad dN = -0^{\circ}98 \quad dI = -0^{\circ}18 \quad da = -''008$$

giving for the epoch 1907.2

$$a = 16''279 \quad N = 188^{\circ}68 \quad I = 116^{\circ}69.$$

Neptune and Satellite.

Position-angle and Distance, from photographs taken with the 26-in. Refractor.

Date and G.M.T.				Position-angle.			Distance.		
				Obs.	Tab.	T - O.	Obs.	Tab.	T - O.
1906.	d	h	m s						
Dec. 27	10	57	45	305°13	305°07	-0°06	14"53	14"72	+0"19
1907.									
Jan. 17	10	14	43	105°43	106°11	+0°68	16°44	16°47	+0°03
	17	10	42 11	104°02	105°30	+1°28	16°54	16°52	-0°02
	17	11	7 30	102°39	104°57	+2°18	16°75	16°57	-0°18
	30	10	30 31	44°20	45°99	+1°79	12°69	12°80	+0°11
	30	10	56 6	43°18	44°76	+1°58	12°60	12°70	+0°10
	30	11	22 51 (a)	43°40	43°43	+0°03	12°84	12°59	-0°25